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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/533,567

05/03/2005

Kazunari Domen

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62479

7590

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EXAMINER

SMITH, JENNIFER A

ART UNIT

PAPER NUMBER

4116

MAIL DATE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/533,567	<b>Applicant(s)</b> DOMEN ET AL.	
	<b>Examiner</b> Jennifer A. Smith	<b>Art Unit</b> 4116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 6/15/05.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 1-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 May 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/15/2005</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Status of Application***

Claims 1-14 are presented for examination.

### ***Priority***

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy of Application No. 2002-340340 filed in Japan on 11/25/2002 has been filed with the instant application on 05/03/2005.

### ***Information Disclosure Statement***

The information disclosure statement (IDS) was submitted on 06/15/2005. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner. Please refer to applicants' copy of the 1449 submitted herewith.

### ***Objections to the Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "1-3" has been used to designate both (1) steps of the synthesis process in Figure 1 and (2) X-ray diffraction patterns for the examples of lamellar metal oxide. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any

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amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (CSJ, 2002) or Takagaki et al. (2002).

In the instant case, claim 1 is drawn to a catalyst  $\text{HTi}_x\text{Nb}_y\text{O}_5$  where:  
x is  $1.1 < x < 1.2$  and y is  $0.9 > y > 0.8$  and Ti/Nb atomic ratio z of  $1 < z < 1.5$ .

Instant claim 2 further limits the atomic ratio z to  $1.2 < z < 1.4$ .

Yoshida et al. teaches a metal oxide catalyst  $\text{HTiNbO}_5$ . The Ti/Nb atomic ratio (z) in this case is 1. "x" and "y" are both 1.

Takagaki et al. teaches catalyst composition of  $\text{H}_{0.9}\text{Ti}_{0.9}\text{Nb}_{1.1}\text{O}_5$  in Section 3, Results and conclusion. The Ti/Nb atomic ratio (z) in this case is 0.818. "x" is 09 and "y" is 1.1.

Yoshida and Takagaki do not describe a catalyst in which "z" has a value between 1.2 and 1.4 but the investigation of changes in catalytic activity associated with changes in atomic ratios has been conducted in the past. This is a design parameter that can be set appropriately by a person skilled in the art, when necessary, and limiting those design parameters to optimum ranges involves no particular difficulty. Optimizing the preferred numerical ranges of x, y, and z, and restricting them to the ranges of the instant claims as in the Yoshida and Takagaki references demonstrates the normal inventive capacity of one skilled in the art.

The solid acid catalyst of the Yoshida reference is obtained by removal of proton exchangers by an aqueous solution by re-coagulation by proton to obtain the 2 sheet aggregate. The proton exchangers are removed by an aqueous solution of tetrabutylammonium (organic ammonia). Said proton is a strong Bronsted acid. Furthermore, the preferred concentration of acid is merely a matter to be established as needed by a person of ordinary skill in the art. The claimed product appears to be the same or similar to that of the prior art, although produced by a different process. The burden shifts to applicant to come forward with evidence establishing an unobvious

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difference between the claimed product and the prior art product. See *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983)

2. Claims 3-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al. (CSJ, 2002) or Takagaki et al. (2002) in view of Hara et al. (2002).

The instant claims 3-7 further limit the catalyst of claims 1:

- Ti/Nb atomic ratio  $z$  of  $1 < z < 1.5$
- The organic amine or organic ammonium is ethylamine, propylamine, or tetrabutylammonium
- The surface area of coagulated titanium niobate nano-sheet is 10 times or more the surface area of cation exchangeable lamellar metal oxide proton exchanger. This is in the range of  $60 \text{ m}^2/\text{g}$  to  $150 \text{ m}^2/\text{g}$

It has already been shown that the atomic ratios are design parameters which can be set by one in the art. Yoshida et al. also teaches the organic ammonium used to be tetrabutylammonium

Hara et al., in Section 2, teaches preparation of the catalyst  $\text{HTiNbO}_5$  in an aqueous solution of tetrabutylammonium and with a 0.1M solution of nitric acid. The nano-sheet material has 150 times larger surface area of  $150 \text{ m}^2/\text{g}$  compared with that of before removal.

Claims 8-14 are drawn to an ester dehydration condensation catalyst comprising the catalyst of claims 1-7, respectively. The claims 1-7 are obvious over the prior art of record – Yoshida, Takagaki, and Hara. Takagaki et al., in Section 3, teaches a higher activity in esterification reaction with the titanium niobate oxide sheet aggregate than with zeolite or hydrous niobic acid. Takagaki also gives motivation to modify the invention saying when the composition of  $\text{HTiNbO}_5$  is changed, acid catalytic activity is changed along with the change of composition.

Therefore claims 1-14 are obvious over the prior art of record.

### ***Conclusion***

Claims 1-14 are rejected

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Smith whose telephone number is 571-270-3599. The examiner can normally be reached on Monday - Friday, 8:30am to 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jennifer A. Smith  
November 28, 2007  
TC 4116

JS  
/Vickie Kim/

Supervisory Patent Examiner, Art Unit 4116